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HCLR: A Hybrid Cross-Layer Routing Protocol For MANETs

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BRIEF DESCRIPTION

Hybrid Routing protocol for more intelligent routing decisions on mobile ad-hoc networks (MANETs).It features leveragesdproactive and reactive routing schemes, a routing table generated globally using existing proactive routing protocol, and locally performed route optimization using on-demand reactive routing protocol.

FULL DESCRIPTION

This invention as a Hybrid Cross-Layer Routing (HCLR) protocol was designed and implemented based on the premise of being able to leverage a pair of proactive routing (PR) and reactive routing (RR) schemes. The proactive component generates global routing paths and avoids long delays associated with reactive protocols while the reactive component makes local routing decisions based on the available cross-layer information. Compared to standalone proactive or reactive routing protocols, HCLR provides a two-tier improvement logic by performing local on-demand search in an n-hop neighborhood utilizing a 2-tuple cross–layer routing metric.

HCLR consists of three major components: PR, RR, cross layer interface (CLI). The PR can be any existing proactive routing protocol (PRP) which disseminates the topology information and generates the baseline routing table. The RR is implemented as an on-demand routing protocol that only performs a light weight routing discovery in a local n-hop neighborhood on the basis of the global routing table that is already generated by the PR. The RR periodically queries link quality information from the MAC at a certain time interval. This time interval is adaptive to frequency and link strength variations. The CLI bridges the routing components and the MAC layer. The result is a protocol that generates the routing table globally but performs optimizations locally, utilizing an on-demand approach.

Routing protocols describe how routers communicate with each other and choose routes among nodes on a computer network, enabling connections between devices on a network. A routing protocol allows the router to learn the topology of the network and choose a routing path.

In Mobile Ad Hoc Networks (MANETs), the network topology is constantly changing. Devices are connected wirelessly and move independently, making and breaking connections with other devices frequently.These wireless link effects impose unique challenges to routing protocols.

Routing protocols previously developed for MANETs can typically be classified into two categories: reactive and proactive protocols. Reactive routing protocols (RRPs) only create routes between nodes when information needs to be sent. These protocols can avoid network wide topology information flooding, but they are often subject to long latencies. In contrast, proactive routing protocols (PRPs) attemptat maintaining constantly updated network topology information. With these protocols, a route to every other node is always available, but such protocols introduce a significant bandwidth overhead.

UCI researchers have developed an improved routing protocol for MANETs that leverages both proactive and reactive routing protocols for more intelligent routing decisions.

SUGGESTED USES

CONTACT

Ben Chu
ben.chu@uci.edu
tel: .

INVENTORS

» Li, Xiaolong

» Yousefizadeh, Homayoun

OTHER INFORMATION

KEYWORDS

MANET, Proactive Routing Protocols (PRP), Zone Routing Protocol (ZRP), Networking

CATEGORIZED AS

» **Communications**

» Internet

» Networking

» Wireless

» **Computer**

Wireless communications and networking

ADVANTAGES

Compared to standalone proactive or reactive routing protocols, HCLR provides a two-tier improvement logic by performing local on-demand search in an n-hop neighborhood utilizing a 2-tuple cross-layer routing metric.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	8,665,890	03/04/2014	2011-605

RELATED CASES

2011-605-0

LEAD INVENTOR

Homayoun Yousefi'zadeh
Adjunct Professor, Department of Electrical Engineering and Computer Science
Henry Samueli School of Engineering
University of California, Irvine

https://www.eng.uci.edu/users/homayoun-yousefizadeh
http://newport.eecs.uci.edu/~hyousefi/

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5270 California Avenue / Irvine,CA
92697-7700 / Tel: 949.824.2683